

# UNLOCK THE TRUTH ABOUT SEVERE KNEE PAIN

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STRATEGIES TO OVERCOME YOUR  
PAIN AND ACCELERATE RECOVERY

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# WHAT IS GOING ON WITH MY KNEE?



## Overview.

First off, understand that you are not alone and there is help out there. If you're reading this e-book, you are most likely part of the 13% of women or 10% of men that suffers with knee osteoarthritis<sup>(1)</sup>. Or you may know someone close to you suffering.

This e-book is meant to give you a vast understanding of the pain you are going through, what osteoarthritis really is, the possible causes of your pain, and the research behind the current therapies used to combat arthritic pain.

In addition, we outline our Axis Knee Program, which has been helping countless knee patients finally get their lives back.



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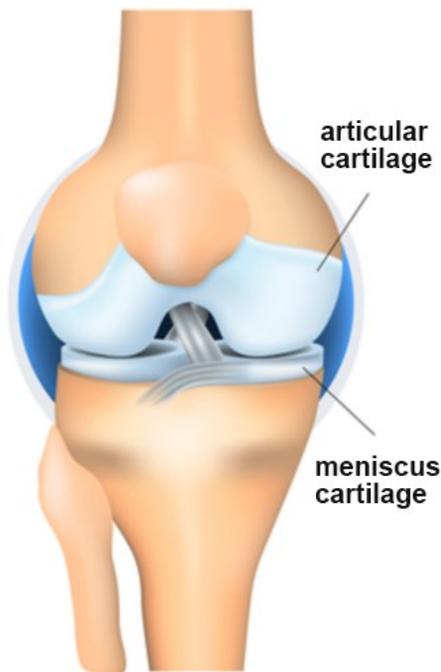
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*Understand knee anatomy. Start with cartilage.*



The knee joint is created from the articulation of two bones, the thigh bone (*femur*) and the main leg bone (*tibia*). This makes the knee joint a full weight-bearing joint.

The knee joint contains two types of cartilage:

- *Meniscus cartilage*
- *Articular cartilage*

Many can be confused about the differences between the two, making it critical for us to delve into this to be able to understand osteoarthritis.

Let's get right into it.

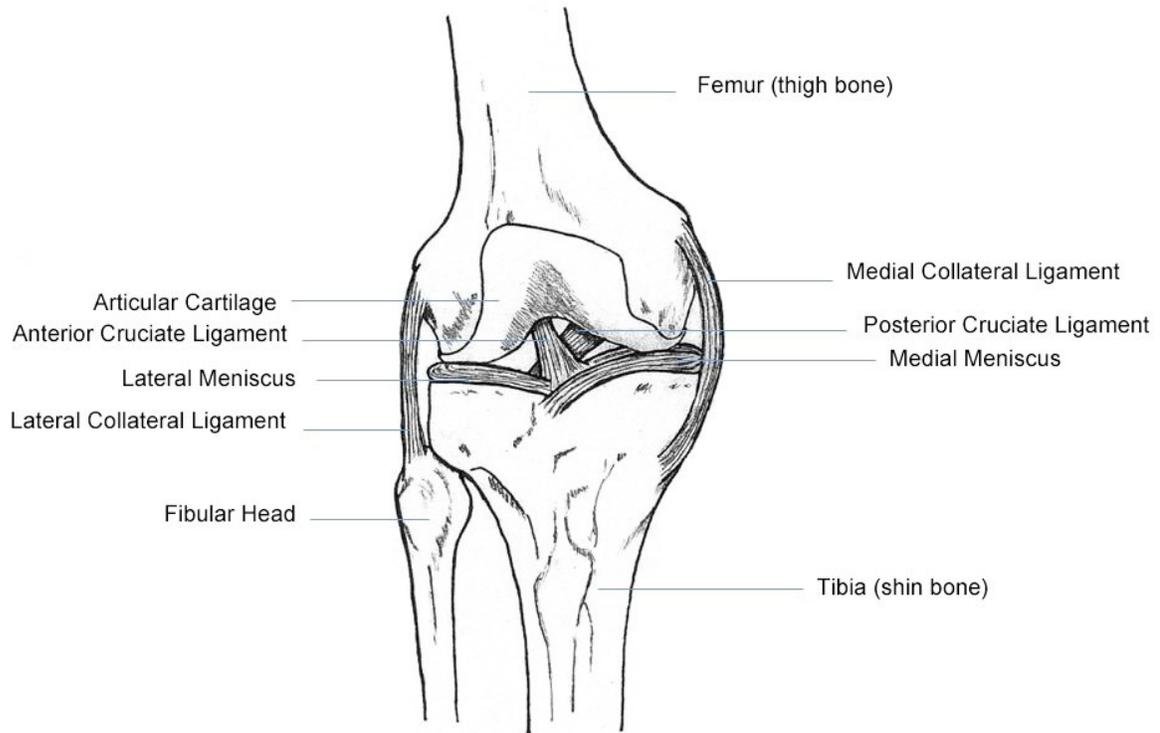
## ***What's the difference between meniscus & articular cartilage?***

The meniscus is the cushion cartilage of the knee and is broken down into a medial (inside) and lateral (outside) component. You can think of the meniscus as the “**cushioning cartilage**”. This type of cartilage does not wear down or thin during your life time. Therefore, this type of cartilage is not directly impacted through the process of osteoarthritis. However, it's material allows it the possibility of tearing overtime.

The articular cartilage covers the end of a bone within a joint. It's main function is to reduce friction when a joint is moving to allow it to have a smooth gliding surface. You can think of articular cartilage as providing a “slick” surface. This is normally a quarter of an inch in depth. ***This is the cartilage that wears thin and causes arthritis.***

In the next page, we'll talk about the ligaments that stabilize our knees.

*The ligaments, how our knees are stabilized.*



The Knee is Stabilized By 4 Main Ligaments:

- *Anterior Cruciate Ligament (ACL)* -
- *Posterior Cruciate Ligament (PCL)* -
- *Medial Collateral Ligament (MCL)* -
- *Lateral Collateral Ligament (LCL)* -

Ligaments, in general, connect bone to bone and thus prevent excessive movement in a joint. They restrict movement outside the normal joint range and prevent dislocations.

When excessive force is put on a joint, these ligaments can give out and tear.

The ACL prevents excessive forward movement of the tibia on the femur. The PCL prevents excessive backward movement of the tibia on the femur. The MCL prevents excessive lateral movement of the tibia on the femur (valgus stress). The LCL prevents excessive medial movement of the tibia on the femur (varus stress).

## *Let's talk meniscus cartilage.*



The meniscus illustrated to the left shows that there is a medial (inside) and a lateral (outside) meniscus. The meniscus is shaped like a C. Again, this is the cushioning type of cartilage.

Although, the meniscus works great as a sponge to absorb shock, it has poor blood supply. Blood only tends to flow to the outer edges of the meniscus through small arteries. This leaves the inner most portions with lack of blood supply, making it difficult to heal if torn.

### ***Why does the meniscus tear?***

The meniscus has a greater probability of tearing as we age. The meniscus tissue undergoes changes as we get older. By the time we are 40, it has lost half of its blood supply & elasticity.

With reduced elasticity, the meniscus becomes more brittle and thus can only withstand so much tension before it tears. That's why it's common for those who are 40 and older to get meniscus tears doing routine activities they have done all their lives.



### ***How do I know I tore my meniscus?***

There's a few signs that can lead us to think meniscus tear versus a ligament tear. A ligament tear like an ACL can give us the feeling of instability or "giving out".

A meniscus tear can give us more mechanical symptoms, like catching and locking. If it feels like something is stuck inside your knee, that's more likely a meniscus tear. Some will characterize it as a "pebble stuck inside your knee".

A meniscus tear is most usually caused by a combination of compression and rotation of your knee joint. The meniscus gets trapped between the tibia and femur and with the twisting rotatory movement, that's when the tearing happens.

## *The culprit of arthritis, the articular cartilage.*



When you think of articular cartilage, look no further than the treads on your tire. After driving for a period of time, they will thin. It's the same with articular cartilage, as normal wear and tear will cause it to thin over the years. The difference is you can get a new tire, but it's not that easy when it comes to your knee.

Also, damage can occur to a tire if you run over something by accident. Well, articular cartilage can also be damaged by injury.

## ***Everything seemed to go downhill when I turned 40...***

Glucosamine is the raw material your body uses to make cartilage to maintain joint health. After the age of 40, your body stops making optimal amounts of glucosamine. What ends up happening is you get a faster thinning of cartilage which leads to erosion, inflammation and, as a result, osteoarthritis.

This is exactly why our Axis Knee Program places a focus on supplementation and nutrition. It's absolutely critical.



## ***There are other types of arthritis...***

So we've concluded that thinning and erosion of articular cartilage through wear & tear is what causes osteoarthritis. However, it's a little more complex than that unfortunately. There are other types of arthritis which can damage articular cartilage in a joint.

Another common type of arthritis is inflammatory which can include rheumatoid arthritis, psoriatic arthritis, gout, or ankylosing spondylitis.

These types of arthritis are more-so auto-immune in nature where your body attacks your own articular cartilage causing damage, erosion, and as a result, arthritis. In these cases, medications such as immune-suppressants are part of the treatment protocol.

## What can increase the likelihood of developing osteoarthritis?



Osteoarthritis (OA) is one of the most prevalent conditions which can result in disability especially in the elderly. Knee OA is particularly important not only because of its high prevalence rate compared to other types of OA, but also because of its presentation in younger age groups, especially in younger obese women<sup>(1)</sup>. The knee is the most common joint affected with OA with up to 41% of limb arthritis in the knee, compared to 30% in hands and 19% in hips<sup>(2)</sup>.

### Risk factors include...

#### Age<sup>(1)</sup>

- Approximately 13% of women and 10% of men who are 60 years and older have symptoms as a result of knee OA.
- The incidence of knee OA increases with age and further increases with longer lifetime.

#### Obesity<sup>(1)</sup>

- Increased levels of leptin (unusually high in obese population) have implications for the onset and progression of knee OA.
- The relationship between BMI (Body Mass Index) and knee OA is linear. The higher the BMI, the increased rate of knee OA.
- 69% of knee replacement surgery is attributed to obesity.

#### Chronic Diseases<sup>(1)</sup>

- A history of diabetes, cancer, or cardiovascular disease increases the likelihood of developing knee OA.

#### Trauma<sup>(1)</sup>

- Prior knee trauma increases risk of knee OA by 3.86 times

## Is everyone bound to get knee OA?

### Risk factors continued...

- Repetitive Trauma**<sup>(1)</sup>
- Participation in sports or injury to the knee joint can predispose adolescent athletes to the development of early onset OA.
- Kneeling**<sup>(1)</sup>
- Occupations which involve kneeling for 2 hours or more have a two-fold increased risk of developing moderate to severe OA.
- Squatting**<sup>(1)</sup>
- Squatting for extended periods during work can predispose to the development of knee OA. 40% of men and approximately 68% of women who developed knee OA reported squatting for more than 1 hour per day at age 25.
- Meniscal Injuries**<sup>(1)</sup>
- Meniscal surgeries increase the risk of knee OA by 2.6 times.
  - Those who underwent partial meniscectomy are significantly more likely to show signs of radiographic (x-ray) knee OA.
- Other Risk Factors**<sup>(1)</sup>
- Vitamin D deficiency
  - Muscle weakness
  - Joint laxity
  - Increased number of pregnancies
  - Genetic susceptibility



### Does this mean that it's inevitable to get knee OA ?

Everyone will develop some level of knee OA during their lifetime as they age. However, the above risk factors increase both the likelihood of developing more severe levels of OA and also developing OA earlier on in life (prematurely). Symptoms of knee OA do not always correlate with level of osteoarthritis seen on x-ray.

# IS THERE A CURE FOR KNEE OA?

*The simple answer is no, however...*

***If there's no cure, is everyone going to have to get a knee replacement at some point?***

Just because there is no cure, it doesn't mean that there's no hope. Osteoarthritis is not reversible, meaning that the damage to the articular cartilage that has occurred will never repair. However, when diagnosed and managed early through conservative measures & lifestyle changes, this can significantly slow the progression of the arthritic process. Knee replacement should be the last resort in every case.



***The most common therapies summarized...***

## **- ACUPUNCTURE<sup>(3)</sup> -**

- A study included 1007 patients who had at least 6 months of knee pain due to osteoarthritis. They were randomly selected into either an experimental group who had traditional Chinese acupuncture (TCA) or a control group who had sham acupuncture. These were in addition to the conservative physiotherapy and anti-inflammatory drugs that was consistent between the groups.
- Success rates were defined by at least a 36% improvement in the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) at 26 weeks.
- Success rates were 53.1% for the TCA group and 51% for sham acupuncture group.
- As a result, there was no significant difference between TCA and sham acupuncture when added to other conservative measures.

# IS THERE A CURE FOR KNEE OA?

*Common therapies continued...*

## - AQUATIC PHYSICAL THERAPY<sup>(4)</sup> -



- A study included 71 patients with symptomatic knee OA who were randomized into two groups. One group received 6 weeks of aquatic therapy and the other group did not receive aquatic therapy.
- The group that received aquatic therapy had less pain, less joint stiffness, greater physical function, quality of life, and muscle strength following the 6 weeks.
- 72% and 75% of the participants in the aquatic therapy group reported improvement in pain and function, respectively. While, only 17% of the control group reported any improvement.
- The benefits of the aquatic therapy remained 6 weeks following the program.
- When compared to no intervention, a 6-week aquatic physical therapy program resulted in significantly less pain and improved physical function, strength, and quality of life.

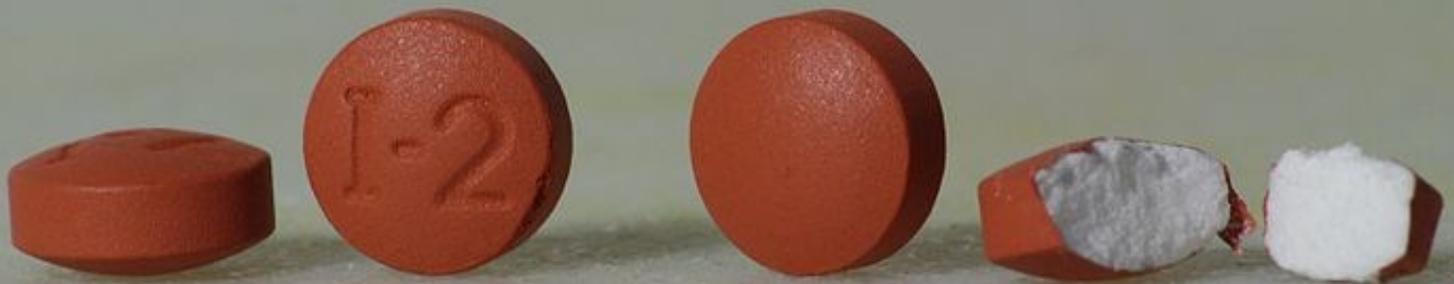
## Common therapies continued...

### - TOPICAL NSAIDs<sup>(5)</sup> -

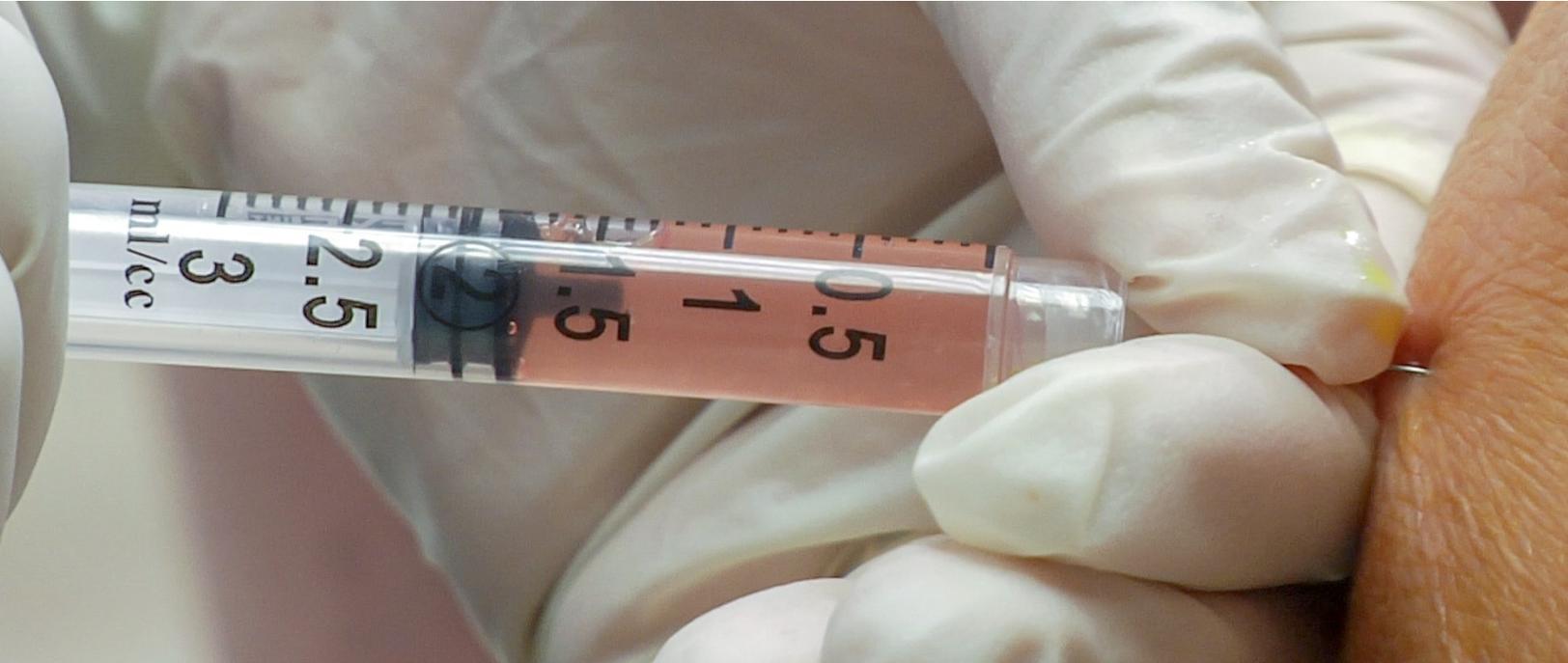
- In one systematic review, topical diclofenac or ketoprofen was shown to alleviate pain. In another review, it showed that they have limited efficacy in knee OA at 6 to 12 weeks.
- Although there is controversy in regards to the role of topical NSAIDs, current management for knee OA recommends use of them as one of the first-line therapies.
- Topical NSAIDs have been shown to have fewer gastrointestinal complication when compared to oral.

### - ORAL NSAIDs<sup>(6)</sup> -

- The most widely used therapy used to alleviate symptoms of knee OA.
- Preliminary clinical trials show that the NSAID indomethacin has a negative influence on joint structure overtime.
- Other NSAIDs including diclofenac and naproxen showed no signs of acceleration of OA damage after 2 years of usage.
- There is no convincing data to show that NSAIDs have any favourable effects on cartilage overtime.



\*NSAIDs: Nonsteroidal Anti-Inflammatory Drugs\*



### - STEM CELLS<sup>(7)</sup> -

- 25 patients with knee OA who underwent arthroscopic surgery were administered stem cell injections.
- When compared to the control group (arthroscopic surgery with no stem cell injections), the results concluded that intra-articular stem cell injections provides assistance in reducing pain and improving function.

### - HYALURONIC ACID<sup>(8)</sup> -

- When compared to NSAIDs for treatment of knee OA, there was no statistically significant difference.
- Given the safety profile of hyaluronic acid injections, these results suggests that it might be a more viable alternative to NSAIDs for knee OA, especially for the elderly who are at increased risk of adverse events.

## *Common therapies continued...*

### - HOME BASED EXERCISE THERAPY<sup>(9)</sup> -



- A study placed 179 subjects who had an average age of 74 years and radiographic evidence of mild to moderate knee OA. They were randomized into either into a progressive home based exercise program or a control group with no exercise.
- WOMAC results were measured before the study and after 8 weeks. All subjects were also given the NSAID oxaprozin.
- Greater reduction in activity related pain and improvement in self-paced walking & stepping functional tasks was found in the exercise group when compared to the control group. Passive range of motion also had a greater reduction in the exercise group.
- The conclusion was that the addition of a progressive exercise program to an already existing treatment of NSAID therapy in patients with knee pain can improve measures of activity and activity related pain.

## Common therapies continued...

### - ARTHROSCOPIC DEBRIDEMENT<sup>(10)</sup> -

- Arthroscopic debridement (AD) is a surgical intervention which involves removing damaged cartilage or bone.
- A study divided patients into two groups: one group who received AD and one group that was a control who did not receive AD. Both groups were followed for 12 months.
- The ability to function 2 weeks after treatment improved 8 more points (on a scale of 0 to 100) for the placebo group. The ability to function 12 months after treatment improved 7 more points (on a scale of 0 to 100) for the placebo group.
- These results show that the AD group experienced significantly more limited function when compared to the group that did not receive AD.



With so many options available for the treatment of knee OA and all the conflicting results, it's no wonder why the vast majority of chronic knee patients have a hard time knowing where to turn for answers.

This is the main reason why we created the **Axis Knee Program** which is tailor made for patients dealing with chronic severe knee pain.

# AXIS KNEE PROGRAM



*What it's all about.*



# AXIS

The ***Axis Knee Program*** is tailor made for patients with chronic moderate to severe knee pain. It is specially crafted for patients suffering from *knee osteoarthritis, degenerative knees, and meniscus tears.*

The program was created by Runway Health through combining our experience with treating a large volume of severe knee patients and evidence-based research. We have been tinkering with the logistics, intricacies, and details of the program since it's origin. As a result, we have continued to improve the program based on patient experience, patient recommendations, and developing research.

A thorough examination must be performed prior to treatment to ensure that the patient has a condition or diagnosis that is eligible for the Axis Program and that there are no contraindications to treatment protocol. In certain cases, further medical imaging in the form of x-rays or MRIs is required as safety is of top priority to our patients.

The program combines three main elements:

- *Laser Enhanced Knee Decompression* -
- *Advanced Manual Therapy* -
- *Knee-Boost Supplement Stack* -

*Synergistically combining two effective modalities.*

## - LASER ENHANCED KNEE DECOMPRESSION -

This is the ***catalyst*** to our Axis Knee Program. The majority of the patients that we see present with moderate to severe osteoarthritis in their knee. As we have mentioned earlier, this means that their articular cartilage has thinned quite a bit which in turn creates a lack of space between the femur and the tibia. This creates the pressure & pain felt by most.

It is a painless & safe treatment that works by creating a pull on your knee and thus opens the space in the joint. The pull is generated by a computerized system based on case-specific parameters that are determined by examination findings. The pull is not static as it creates an oscillatory effect to minimize muscle spasm and create a pumping mechanism. The pull creates a negative pressure in the joint (similar to a vacuum-like effect) that draws in water and nutrients to lubricate & nourish your knee.

Simultaneously, therapeutic laser is penetrated deep into the knee joint for effective healing, pain relief, and inflammation reduction. Without opening the knee joint during decompression, the laser cannot penetrate as deep as it needs to for maximal results.



*By combining these two effective modalities simultaneously, it creates a synergistic effect that is much greater than if only one is applied at a time.*

*Decompression makes sense, but what's with the laser.*



## ***Why the laser?***

While the decompression makes perfect sense as it provides space in the joint which creates a negative pressure to draw in water and nutrients, what is the role of the laser?

- *Accelerates cell reproduction*
- *Speeds collagen synthesis*
- *Increases metabolic activity*
- *Reduces inflammation*
- *Increases vascular activity*
- *Stimulates nerve function*

## **Research to back it up...**



A meta-analysis of 34 research articles concluded that laser is a highly effective therapeutic technique for tissue repair and pain relief. The positive effect on parameters of tissue repair included collagen formation, rate of healing, tensile strength, & tensile stress. Positive effects were also found with respect to pain reduction<sup>(11)</sup>.

*Continuing with the Axis program.*

## **- ADVANCED MANUAL THERAPY -**

Advanced Manual Therapy is another critical component of our program. It is a hands-on treatment that is used by our therapists to loosen up the specific musculature required around your knee joint. This is used to reduce the compression on your knee joint that is created by tight muscles. This is always performed prior to your decompression to allow a smooth, painless, & highly effective knee decompression session.

As your knee joint is being opened during decompression, it is a natural reaction for the muscles around your knee to “guard” or tighten in response to resist the movement. By working on releasing the musculature before your decompression session, this minimizes this “guarding mechanism” and allows a much more effective decompression of your knee joint. This is typically fairly pain-free for the patient.



## *Why is nutrition so important anyways?*



### **- KNEE-BOOST SUPPLEMENT STACK -**

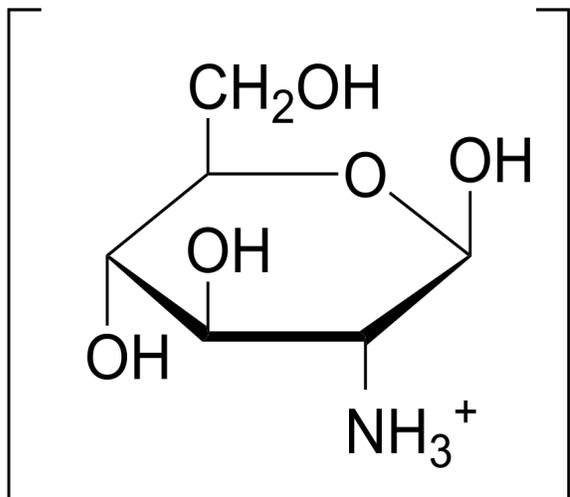
This part of the program further accelerates your recovery and maintains long-term results even after your in-office treatment is complete. We all know that diet, nutrition, & natural supplementation is critically important to our joint health.

We provide you with the exact supplement stack to be able to re-nourish your knee with the most effective healing and anti-inflammatory properties. We also guide you through an anti-inflammatory diet and monitor your progress. This aspect of your treatment takes your recovery to the next level.

This part of the program provides three main guidelines:

- *Joint Formula* -
- *Natural Anti-Inflammatories* -
- *Anti-Inflammatory Diet* -

## What's the big fuss about glucosamine?



### **How is this compound going to help?**

One of the biggest contributing causes to osteoarthritis is the age-related decline in the body's ability to synthesize the compound glucosamine. This starts to become fairly pronounced around the age of 40.

Glucosamine sulfate, which is synthesized from chondrocytes (cells in cartilage), is the precursor to the production of chondroitin sulfate, which in-turn, forms hyaluronic acid. This increases the viscosity of synovial fluid, which helps reduce wear & tear<sup>(12)</sup>.

### **So why not take chondroitin sulfate to save a step?**

This is a common question but has a very simple answer. When orally ingesting chondroitin sulfate, less than 13% ends up being absorbed from the intestinal tract, therefore making it very ineffective. If it's not absorbed, it is basically useless.

In turn, studies have shown that orally ingesting glucosamine sulfate leads to 90-98% absorption into the intestinal tract. Therefore, it is significantly more effective as an intervention for the prevention and management of osteoarthritis<sup>(13)</sup>. Glucosamine isn't found in food and must be supplemented.

### **Why aren't medical doctors prescribing it?**

They absolutely should be. A meta-analysis which analyzed the effectiveness of glucosamine sulfate for the treatment of OA concluded that it was highly effective in all 13 clinical trials that were conducted<sup>(14)</sup>.

The journal of Therapeutic Advances in Musculoskeletal Disease produced a study in 2012 explaining why medical doctors should be using glucosamine sulfate to manage osteoarthritis patients. This research even showed that glucosamine sulfate blocks release of inflammatory chemicals that are produced during the process of OA<sup>(15)</sup>.

## ABOUT THE AUTHOR



*Get to know a little more about me.*

### - Dr. Omar Abdulsattar -

I am a qualified chiropractic doctor who graduated with *summa cum lauda* distinction and is registered to practice in the province of Ontario. I primarily focus on the treatment of chronic moderate to severe knee pain. I co-own a private health practice, called Runway Health, which is located in Markham, Ontario. The patient load is primarily patients suffering with chronic knee pain, with the majority diagnosed with osteoarthritis.

I have spent numerous years attaining further knowledge, research, and experience with chronic knee pain cases. As a result, I have developed the Axis Knee Program that attracts patients from all over the Greater Toronto Area for treatment.

I have instructed manual therapy courses for registered health professionals in both Canada and the United States focusing on chronic pain techniques. This includes courses in New York (photo below), New Jersey, Philadelphia, Chicago, Toronto, & Vancouver.

I find the art of manual therapy rewarding, I enjoy the challenge of dealing with complex multifaceted cases where innovation & use of the literature combine to create effective patient results. The satisfaction of removing one's pain & disability is always the ultimate for me.



*Where our research is backed by.*

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